

# ASSESSMENT OF VOLATILE ORGANIC COMPOUNDS IN NEWBORN BABIES' HOMES: AN ENVIRONMENTAL INVESTIGATION IN THE PARIS BIRTH COHORT

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**Background and Aims:** There is a growing public health concern about indoor air quality. Until now few data on indoor chemical pollutants in dwellings are available, although relations between exposure to indoor chemical air pollutants and respiratory/allergic diseases are suspected. Moreover exposure in the first months of life is determinant because of the infants' vulnerability. The aim of this study was to document airborne volatile organic compounds (VOCs) levels in Paris dwellings.

**Methods:** An environmental investigation was conducted in homes of a random sample of newborn babies (n=196) from the PARIS (*Pollution and Asthma Risk: an Infant Study*) birth cohort. The VOCs measurements were repeated at 1, 6, 9 and 12 months of age. Air samples were collected in the child's bedroom, over one week using passive devices (Radiello®). Twelve VOCs were identified and quantified by gas chromatography/mass spectrometry. Annual levels defined as average of seasonal levels were calculated for all compounds to assess exposure to VOCs throughout one year.

**Results:** Aromatic hydrocarbons (benzene, toluene, *m,p*-xylenes, *o*-xylene, 1,2,4-trimethylbenzene, ethylbenzene, and styrene), aliphatic hydrocarbons (decane, undecane), and chlorinated hydrocarbons (trichloroethylene, tetrachloroethylene, and 1,4-dichlorobenzene) were quantified in all dwellings. Toluene was the most abundant compound, its annual median level was 17.2 µg/m<sup>3</sup> (interquartile range-IQR: 12.8-24.6 µg/m<sup>3</sup>) followed by aliphatic compounds. Median levels of decane and undecane were 7.6 µg/m<sup>3</sup> (IQR: 4.9-13.9 µg/m<sup>3</sup>) and 9.3 µg/m<sup>3</sup> (IQR: 6.4-17.5 µg/m<sup>3</sup>) respectively. Trichloroethylene levels were the lowest indoors, its median was 0.7 µg/m<sup>3</sup> (IQR: 0.5-1.0 µg/m<sup>3</sup>). The highest range of VOCs values was for chlorinated hydrocarbons. Trichloroethylene, tetrachloroethylene and 1,4-dichlorobenzene levels ranged from 0.25 to 104.7 µg/m<sup>3</sup>, 0.6 to 124.2 µg/m<sup>3</sup> and 1.3 to 783.4 µg/m<sup>3</sup> respectively, the highest levels being probably due to specific occupants activities.

**Conclusion:** This study provides helpful information on chemical contamination in dwellings. Identification of determinants levels will allow the building of predictive models to estimate infant exposure to pollutants.